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Authors: Vytas Reipa, Shannon Hanna, Aaron Urbas, Lane Sander, John Elliott, Joseph Conny, Elijah J. Petersen



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Efficient Electrochemical Degradation of Multiwall Carbon Nanotubes

Vytas Reipa*, Shannon Hanna, Aaron Urbas, Lane Sander, John Elliott, Joseph Conny, and
Elijah J. Petersen

Materials Measurement Laboratory, National Institute of Standards and Technology,
Gaithersburg, MD, 20899, U.S.A.

*Corresponding author. Tel: +001-301-975-5056. Email:vytas@nist.gov (Vytas Reipa)

Highlights

- Water suspended pristine MWCNT were efficiently degraded in an electrochemical reactor.
- Up to 99% of the initially suspended carbon mass completely mineralized.
- The residual solid particles are mostly amorphous carbon.
- A major reduction in the effluent water toxicity as tested with *C.Elegans*.

Abstract

Abstract

As the production mass of multiwall carbon nanotubes (MWCNT) increases, the potential for human and environmental exposure to MWCNTs may also increase. We have shown that exposing an aqueous suspension of pristine MWCNTs to an intense oxidative treatment in an electrochemical reactor, equipped with an efficient hydroxyl radical generating Boron Doped Diamond (BDD) anode, leads to their almost complete mineralization. Thermal optical transmittance analysis showed a total carbon mass loss of over two orders of magnitude due to the electrochemical treatment, a result consistent with measurements of the degraded MWCNT suspensions using UV-VIS absorbance. Liquid chromatography data excludes substantial accumulation of the low molecular weight reaction products. Therefore, up to 99 % of the

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